

**SIXTH FIVE-YEAR REVIEW REPORT FOR
LACKAWANNA REFUSE SUPERFUND SITE
LACKAWANNA COUNTY, PENNSYLVANIA**



Prepared by

**U.S. Environmental Protection Agency
Region III
PHILADELPHIA, PENNSYLVANIA**

A blue ink signature of Paul Leonard is written over a horizontal line.

**Paul Leonard, Acting Division Director
Superfund and Emergency Management Division**

SEP 9 2019

Date

Table of Contents

LIST OF ACRONYMS	3
FIVE YEAR REVIEW SUMMARY FORM	5
II. RESPONSE ACTION SUMMARY	5
Basis for Taking Action	5
Initial Response	6
Remedial Actions	6
Status of Implementation	7
III. PROGRESS SINCE THE LAST REVIEW	9
IV. FIVE-YEAR REVIEW PROCESS	11
Community Notification, Involvement & Interviews	11
Data Review	11
Site Inspection	12
V. TECHNICAL ASSESSMENT	13
QUESTION A: Is the remedy functioning as intended by the decision documents?	13
QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?	13
QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?	14
VI. ISSUES/RECOMMENDATIONS	14
VII. PROTECTIVENESS STATEMENT	14
VIII. NEXT REVIEW	14
APPENDIX A – REFERENCE LIST	15
APPENDIX B – FIGURES	16

LIST OF ACRONYMS

ATV	All-Terrain Vehicle
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significance Difference
FCOR	Final Closeout Report
FYR	Five-Year Review
GPRA	Government Performance and Result Act
HSCA	Hazardous Site Cleanup Act (PA)
IC	Institutional Control
MCL	Maximum Contaminant Level
MW	Monitoring Well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
ppb	parts per billion
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation / Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
USACE	US Army Corp of Engineers
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, 40 Code of Federal Regulation (CFR) Section 300.430(f)(4)(ii) of the National Contingency Plan (NCP) and EPA policy.

This is the sixth FYR for the Lackawanna Refuse Superfund Site (Site). The triggering action for this policy review is the completion date of the previous FYR. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

The Site consists of one operable unit (OU), which will be addressed in this FYR.

The Pennsylvania Department of Environmental Protection (PADEP) was notified of the start of the FYR on 12/3/2018. The FYR was lead by José R. Redmond Girón, Remedial Project Manager for EPA. Additional participants included other members of the EPA as the lead agency and the Pennsylvania Department of Environmental Protection (PADEP) as the support agency (Table 1). The review began on 12/4/2018.

Table 1: Five-Year Review Team Participants		
Name	Position	Affiliation
José R. Redmond Girón	Remedial Project Manager	EPA
Jeff Tuttle	Toxicologist	EPA
Herminio Concepción	Hydrogeologist	EPA
Lavar Thomas	Community Involvement Coordinator (CIC)	EPA
Susan French	Project Officer (PO)	PADEP

Site Background

The Site consists of 267 acres and is located along the border between Old Forge Borough and Ransom Township, in Lackawanna County, Pennsylvania (See Figure 1). The Site consists of five strip mine pits excavated in the nineteenth century. In the 1970's, three of the mines were used as a permitted municipal refuse landfill. Two of the pits were used for the disposal of municipal and commercial refuse (Pit #2 and Pit #3). Another pit, which was known as Pit #5, contained thousands of illegally buried drums of hazardous waste, as well as municipal refuse. In addition, unknown and unauthorized quantities of bulk liquids were dumped into an adjacent depression known as the Borehole Pit.

FIVE YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Lackawanna Refuse Superfund Site		
EPA ID: PAD980508667		
Region: 3	State: PA	City/County: Old Forge, Lackawanna County
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? No	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): José R. Redmond Girón		
Author affiliation: EPA		
Review period: 12/4/2018 - 9/24/2019		
Date of site inspection: 5/14/2019		
Type of review: Policy		
Review number: 6		
Triggering action date: 9/24/2014		
Due date (five years after triggering action date): 9/24/2019		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1978, a cloud of vapors was released from the Site when a truck driver allegedly dumped his cargo of waste into one of the pits. The cloud moved down the mountainside causing health problems to residents in the adjacent area of Old Forge. In 1979, the Pennsylvania Department of Environmental Resources (PADER, currently known as PADEP), issued an order suspending the Site's solid waste permit and requiring immediate cessation of any landfill associated activities after discovering evidence of the illegal dumping of industrial waste and pollutants into Pit #5. The order also required Lackawanna Refuse, the site operator and owner, to excavate and properly dispose of any buried drums containing hazardous waste and all contaminated soil. PADER issued a second order in 1979 requiring Lackawanna Refuse to construct and operate a leachate collection system. Due to failure to comply with the orders, the Owner, Peter Iacavazzi, Sr. was brought to trial in 1982 in State court on criminal charges and found guilty of illegal

dumping. In 1980 at the request of PADER for assistance, EPA excavated 200 drums from Pit #5. The majority of drums were either broken or crushed, but 20 drums were analyzed and found to contain either liquids or sludge with high concentrations of solvents and paint waste with high metal and solvent contents. Further investigation in 1982 revealed volatile organic vapors being released at low levels from Pit #5.

The Site was proposed to the National Priorities List (NPL) on December 30, 1982 and added to the NPL on September 8, 1984.

Initial Response

A Remedial Investigation (RI) was performed from August 1983 to November 1984 and demonstrated that both organic and inorganic contaminants were present at the Site at elevated levels that presented an unacceptable risk to both human health and the environment. Table 2 lists the contaminants of concern (COCs) found during the RI:

Table 2: Site COCs	
COCs for Groundwater	
Inorganics	Organics
Ammonia	2-Butanone
Boron	1,2-Dichloroethene
Magnesium	Methylene Chloride
Manganese	2-Methyl-2-Pentanone
Nickel	2-Methylphenol
Zinc	Toluene
COCs for Leachate and Surface Water	
Iron	1,2-Dichloroethene
Magnesium	Diethyl Phthalate
Nickel	Isophorone
Ammonia	4-Methylphenol
Benzoic Acid	Toluene
2-Butanone	Xylene
1,1-Dichloroethene	
COCs for Soil and Sediment	
Cadmium	Tetrachloroethylene
Copper	Toluene
Nickel	Bis(2-EthylHexyl)Phthalate
Tin	Di-N-Octyl Phthalate
Zinc	

Remedial Actions

EPA selected a remedy for the site in the March 22, 1985 Record of Decision (ROD). The ROD

states that “The major objective of remedial action at the Lackawanna Refuse Site is to eliminate or at least mitigate environmental contamination:

- In the Pits #2, #3 and #5;
- In the Borehole Pit;
- In the surface soil and in the paint spill along portions of the access road;
- In leachate affected areas through the Site; and
- In the intermediate drainage ditches adjacent to the site.”

The Selected Remedy for the Site consisted of:

- Removal of all drums and highly contaminated municipal refuse from Pit #5 for offsite disposal at a qualifying Resource Conservation and Recovery Act (RCRA) facility;
- Construction of a clay cap over Pit #2, #3 and #5 that meets RCRA requirements;
- Installation of surface water drainage diversion around all three pits and construction of a leachate collection and treatment system for Pits #2, #3 and #5;
- Construction of a gas venting system through the cap of all three pits;
- Removal of the top layer of contaminated soil from the borehole pit for offsite disposal at a qualifying RCRA facility and returning the grade with a soil cover;
- Removal of the top layer of contaminated soil in the paint spill area and reconstruction of the road with the appropriate drainage and sedimentation controls;
- Removal of dried paint and contaminated soil in the paint spill area for the offsite disposal at a qualifying RCRA facility;
- Operation and maintenance (O&M) of the cap and the leachate collection and treatment system to be implemented by the State; and
- Development of a monitoring program during the remedial action to include the monitoring of existing wells onsite, the gas venting system, and the leachate collection and treatment system.

There have been two additional decision documents related to the remediation of this Site. On September 28, 1993 an Explanation of Significant Differences (ESD) was issued for the Site to eliminate the requirement for the leachate collection system. The multi-layered cap over the pits had been so efficient that there was no leachate produced during rain events. Additionally, on February 9, 2010 a second ESD was issued to add institutional controls (ICs) to the Selected Remedy.

In 2014, it was decided that sampling would stop for the gas venting system. After several rounds of sampling with non-detect readings for methane, and based on the age of the landfill, it was determined that sampling for the gas venting system was no longer necessary. The O&M Plan was updated to reflect this change. Currently only groundwater is being monitored at the Site.

Status of Implementation

EPA entered into an Interagency Agreement with the U.S. Army Corps of Engineers (USACE) for the design and construction of the remedial action (RA) in 1985. The construction started in

1987 and continued until May 1991. Approximately 900 cubic yards of contaminated soils were excavated from the borehole area and backfilled with clean soil. The area known as the paint spill area was also excavated (approximately 10 cubic yards) and backfilled with clean soil.

Pit #5 was excavated and the drums and refuse were analyzed for COCs. A total of 8,253 drums were removed from Pit #5 and disposed of offsite. Refuse with elevated contamination was disposed offsite. The remaining refuse that had levels of contamination similar to residential waste was redeposited into Pit #5. Pit #2, Pit #3 and Pit #5 were then covered with a multi-layered cap that included leachate collection lines. All components of the RA were constructed except the leachate treatment plant, because sampling demonstrated that the cap prevented rainfall infiltration into the landfill, thereby preventing the formation of leachate. As a result, EPA determined that it was unnecessary to construct and operate a leachate treatment system. This change was documented in the 1993 ESD.

EPA issued a Final Closeout Report (FCOR) on March 28, 1994. The Site was deleted from the NPL on September 28, 1999.

The Selected Remedy requires ICs to prevent disturbance to the Site cap, installation of wells onsite, use of site groundwater for domestic purposes, excavation of contaminated soil, or any action that may interfere with the remedy. This has been achieved through implementation of the PADEP Hazardous Sites Cleanup Act (HSCA) Section 512 Order dated December 13, 2006.

IC Summary Table

Table 3: Summary of Implemented ICs					
Media, engineered controls, and areas that do not support UU/EE based on current conditions	ICs Nedeed	ICs called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date
Groundwater & Soil	Yes	Yes	Parcel # 17501020 001	Prevent disturbance to the Site cap, installation of wells onsite, use of site groundwater for domestic purposes, excavation of contaminated soil, or any action that may interfere with the remedy.	PADEP 512 Order Dec. 13, 2006. (Recorded Dec. 15, 2006)

System Operation and Maintenance

The O&M Plan was updated in August 2016. Major changes to the previous plan include:

- Reducing the frequency of the sampling to once every five years, with the sampling occurring the year before the FYR report is due;
- Limiting the sampled media to groundwater and seeps. Because seeps have been difficult to locate during the sampling events, if they cannot be located during the sampling event, they are not sampled.

The O&M Plan also defines the actions that PADEP is required to perform to protect the remedy. Those actions include:

- Inspections of the cap, fencing and other components of the remedy
- Maintenance and repair of the cap cover and the vegetation.
- Maintenance and repair of drainage ditches.
- Maintenance of groundwater monitoring wells.
- Sampling of monitoring wells (and seeps if available) and reporting.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 4: Protectiveness Determination/Statement from the 2014 FYR		
OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	Based on the data reviewed and the site inspections, the remedy is functioning as intended by the decision documents. The remedy currently protects human health and the environment in the short term. In order for the remedy to be protective in the long term, sampling must be conducted in accordance with the approved O&M plan and ATVs must be discouraged from trespassing on the Site.

Table 5: Status of Recommendations from the 2014 FYR					
OU #	Issue	Recommendation	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Sampling is not being performed in accordance with the approved O&M plan.	Perform sampling in accordance with the approved O&M plan.	Completed	An updated O&M Manual, with a new sampling and monitoring plan, was submitted by PADEP and approved by EPA in 2015. The new plan established a sampling frequency of once every five years with the sampling event occurring the year prior to the due date of the FYR report. The sampling for this FYR report was performed on December 28, 2018.	12/28/2018
1	Presence of unauthorized all-terrain vehicles (ATVs) at the Site may compromise the engineered cap.	Identify additional measures which can be used to discourage trespassers from damaging the fence to obtain access to the Site.	Ongoing	Increased communication and coordination with local authorities, contracting private security, consideration of a cooperative arrangement with PA Gameland Commission, and others efforts have reduced the use of ATVs in more than 50%. This reduction is a significant improvement, but additional efforts must continue to be directed at trying to stop this unlawful practice	5/14/2019

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Interviews

Both the CIC and the RPM made several attempts to contact the local government (Old Forge, PA) township via email and telephone, and were unsuccessful. During the site visit, the RPM met with representatives from PADEP and inquired on whether the public or township representatives had concerns regarding the Site. There were no questions or interest shown in the Site by either entity. The owner of the Site also indicated that he had not received any questions from the public or township.

Activities to involve the community in the FYR process were initiated with a meeting between the RPM and the CIC on November 6, 2018. A public notice was published in the Scranton Times Tribune local newspaper on May 20, 2019. There have been no inquiries regarding the Site during this FYR period. The results of the FYR and the report will be made available at the Site's information repository, at EPA Region 3, 1650 Arch Street, Philadelphia, PA 19103; and on line at: <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0301220>.

Data Review

No cleanup levels for groundwater were established in the 1985 ROD, 1993 ESD, or 2010 ESD. Therefore, for the purposes for determining if the Site is protective of human health and the environment, groundwater COC concentrations are compared to EPA Regional Screening Levels (RSLs) and Freshwater Screening Benchmarks. Freshwater Screening Benchmarks are threshold values against which measured concentrations can be compared to help assess the potential effects of contaminants on freshwater water quality.

The Site's original use as a mine, as well as the presence of other mines in the area, have affected the quality of the local aquifer. Acidification of the groundwater as well as heavy metal concentrations, especially iron, are observed throughout the region. These conditions render the aquifer unusable for drinking purposes.

The mine shafts and the mine pools created through the mining activities make it impossible to establish a model of the groundwater flow at the Site. It is estimated that most of the groundwater travels vertically down to already degraded mine pools, where it accumulates into what has been estimated to be over a billion gallons of water. The concentrations in the sampled groundwater do not present a threat to human health nor the environment.

There is no known exposure to the impacted groundwater because all area residents are connected to public water, and there is no apparent water discharged from the Site to local creeks or any other body of water that may present an exposure pathway to the public.

Pursuant to the revised 2016 O&M Plan, the sampling frequency has been reduced to once every five years (to occur the year before the FYR is due) starting with this FYR period. The revised sampling plan for the Site requires sampling groundwater and seeps, if seeps are observed.

The sampling for this FYR was performed on December 27, 2018 by DATOM Products, Inc. No seeps were observed during the sampling event; therefore, only groundwater sampling occurred. A total of six wells were to be sampled, all in the periphery of the Site, but only five had sufficient water for sample collection. MW-1 which has a depth of 44.70 feet was found to be dry. The remaining wells (MW-2, MW-11, MW-12, MW-13, and MW-14) were sampled for both volatile organic compounds (VOCs) and metals. The only COC that was found with concentrations above detection limits was 2-butanone (the rest of the COCs were below detection limits or Freshwater Screening Benchmarks). 2-Butanone groundwater concentrations are presented in Table 6 below:

Table 6: Sampling Results for COCs in Groundwater					
COC	MW-2 (µg/L)	MW-11 (µg/L)	MW-12 (µg/L)	MW-13 (µg/L)	MW-14 (µg/L)
2-Butanone	23.5	23.8	23.4	24.1	22.4

The concentrations encountered are similar to previous sampling (slightly lower than results from 2014), but more importantly, they are significantly lower than the RSL (5,600 µg/L for 2-butanone) and the Freshwater Screening Benchmark (14,000 µg/L for 2-Butanone). This screening indicates that the COC concentrations in groundwater do not present an unacceptable risk to human health or the environment.

Site Inspection

The inspection of the Site was conducted on 5/14/2019. In attendance were José R. Redmond, EPA RPM, Christopher Thomas, Superfund Reuse Coordinator EPA, Susan French, Environmental Engineer/Project Officer for PADEP, Scott Bene, Solid Waste Supervisor for PADEP, Robert Lewis, Environmental Group Manager for PADEP, Lou Ciuccio, owner of the property and Joseph Ciuccio, son and assistant to the owner of the property.

The purpose of the inspection was to assess the conditions at the property that may impact directly or indirectly the protectiveness of the remedy. The fence system at the entrance of the property, as well as the perimeter fence that was observed to be in excellent working condition, thereby restricting access to the Site. The road to access the property, as well as the road on the property were clean and in excellent condition. This is notable since the area had seen several days of constant rain, including the day of the Site visit. Run-off channels were also clean and in excellent shape. No seeps associated with the cap area were observed during the Site visit. The top of the cap appeared to be in good condition, with no visual evidence of the use of ATVs. The PADEP representatives explained to EPA that the mowing frequency had been reduced to once a year. This action helps in protecting the cap by dissuading the use of ATVs on-site due to the possibility of hitting any obstacle that may damage the ATVs. Several shrubs were observed on top of the cap area, but it was indicated that the shrubs have a shallow root system (less than 12 inches in depth) and that are easily removable. The depth of the cap exceeds 8 feet, so there is minimal possibility of being affected by the shrubs. No conditions were observed that may compromise current or future protectiveness of the remedy.

During the Site inspection, the Superfund Reuse Coordinator evaluated the reuse potential of the Site based on location, existing infrastructure, and accessibility. A fact sheet regarding information about the property will be prepared and shared with the owner and posted on EPA's Superfund Reuse website to help facilitate reuse of the Site.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Yes. The remedy is functioning as intended by the 1985 ROD, as modified by the two ESDs (1993 and 2010). Contaminated soils and contaminated drums were excavated and removed for offsite disposal, preventing further exposure. In addition, an engineered cap was built over different pit areas, limiting the infiltration due to precipitation, minimizing the potential for runoff or seeps that may carry contaminants offsite, and eliminating the potential for direct contact. Due to the success of the cap in preventing water infiltration, the 1993 ESD eliminated the requirement for a leachate treatment system. ICs are in place to prevent disturbance of the cap.

Groundwater monitoring is currently performed once every five years, in the year prior to the FYR report. The 2018 sampling data indicates that groundwater concentrations are below both human health and ecological screening levels. In addition, residents in the area of the Site are connected to a public water supply and ICs are in place to prevent the installation of groundwater wells and use of groundwater onsite.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

No. While the RAOs for the remedy remain valid, some of the the exposure assumptions and toxicity data have changed since the time of remedy selection; however, these changes do not impact the protectiveness of the remedy because there are no complete exposure pathways at the site. At the time of the Selected Remedy, the RAOs selected for the Site were chosen to mitigate and minimize environmental contamination.

Changes in the Risk Assessment Guidance since the time of remedy selection would lead to more stringent cleanup levels than those selected in the 1985 ROD; however, those changes do not impact the protectiveness of the remedy. The installation and O&M of the cap and ICs prevent exposure to COCs at unacceptable levels.

Toxicity values and standards have also changed since the 1985 ROD. These include changes in dermal guidance, inhalation methodologies, exposure factors, and a change in the way early-life exposure to certain chemicals is assessed. However, as indicated above, because the cap and ICs prevent exposure to Site COCs at unacceptable levels, these changes do not impact the protectiveness of the remedy.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. There is no new information that calls into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Sitewide

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement	
<i>Protectiveness Determination:</i> Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date
<i>Protectiveness Statement:</i> Based on the data reviewed and the site inspection, the remedy is protective of human health and the environment. Contaminated soils and contaminated drums were excavated and removed for offsite disposal, preventing further exposure. In addition, an engineered cap was constructed over the former pit areas, limiting the infiltration due to precipitation and minimizing the potential for runoff or seeps that may cause offsite migration of contamination. Groundwater sampling confirms that levels of contaminants found at the Site do not present a risk to Human health and the environment. ICs are in place to prevent exposure to remaining contamination and protect the integrity of the remedy components.	

VIII. NEXT REVIEW

The next FYR report for the Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

- USEPA; Lackawanna Refuse Superfund Site Five-Year Review report. September 24, 2014. 20 pages.
- USEPA; EPA Superfund Record of Decision: Lackawanna Refuse. March 22, 1985. 48 pages.
- PADEP; Administrative Order Pursuant to Section 512(a) and 1102 of the Pennsylvania Hazardous Site Cleanup Act, 35 P.S. §§6020.512(a) and 6020.1102. 22 pages.
- PADEP; Operation and Maintenance Reports (2014-2018).
- USEPA; Final Close-Out Report. March 28, 1995. 9 pages.
- USEPA; Remedial Investigation Report. August 01, 1984. 166 pages.
- USEPA-PADEP; Superfund State Contract. August 1989. 6 pages.
- USEPA; Feasibility Study of Remedial Alternatives. February 1985. 145 pages.
- USEPA; Second Explanation of Significance Difference. February 9, 2010. 5 pages.
- USEPA; Explanation of Significance Difference. September 28, 1993. 9 pages.
- PADEP; Lackawanna Refuse Superfund Site Sampling Results. January 16, 2019. 17 pages.

APPENDICES B-- Figures

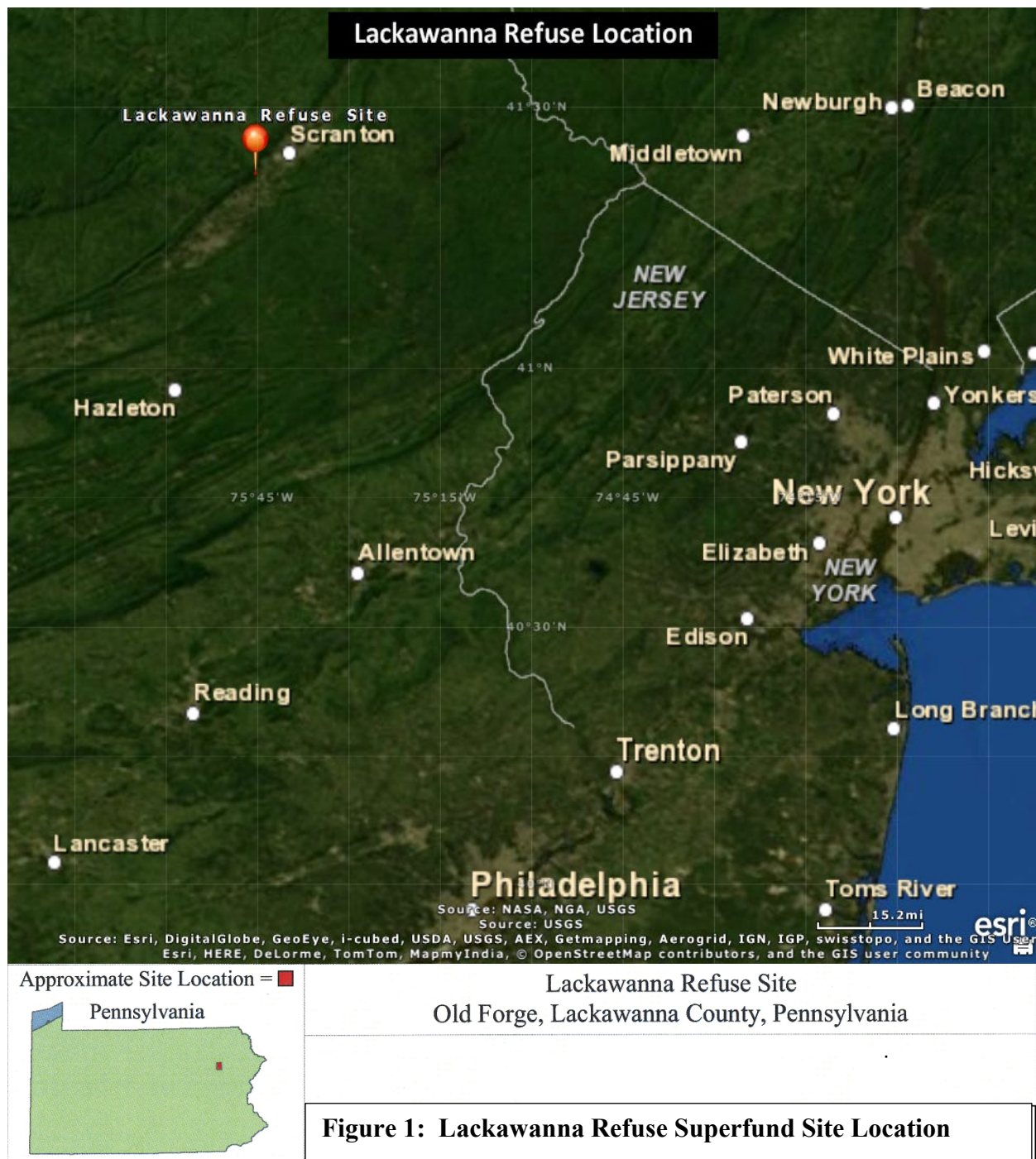




Figure 2: Lackawanna Refuse Superfund Site